Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

DR. EDMOND M. DEWAN RECEIVES THE HAROLD BROWN AWARD

Dr. Edmond M. Dewan recently received the prestigious Harold Brown Award for creating the template used to determine atomospheric weather conditions. The Harold Brown Award, named for Dr. Harold Brown, the former Secretary of Defense under President Jimmy Carter, who was a renowned nuclear engineer, mathematician, and public servant. Dr. Brown was also a former Secretary of the Air Force.

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Accomplishment

Dr. Dewan, a researcher with the Space Vehicles Directorate, Spacecraft Technology Division, whose work is funded by the Air Force Office of Scientific Research (AFOSR) created an optical turbulence model that converts vertical profiles of atmospheric winds and temperature into vertical profiles of the optical turbulence parameter. The Airborne Laser (ABL) Missile Defense System Program Office selected the Dewan Model for incorporation into the Atmospheric Decision Aid (ADA) to operate with the ABL Missile Defense System.

Background

Dr. Dewan's model is especially significant to the Air Force because of its impact on the ABL theatre missile defense system scheduled for deployment this decade. The effectiveness of this system is strongly dependent upon atmospheric optical turbulence in the upper troposphere and lower stratosphere. For this reason, there is a requirement for an optical turbulence forecaster.

The Air Force designed the ABL system to destroy a theatre missile in the boost phase by means of a high-energy laser, but turbulence can diffuse, distort, and deflect the laser beam. In a worst case scenario, turbulence could make the ABL inoperative.

The Air Force positions the ABL relative to the target in a manner to avoid as much turbulence as possible, using an ADA. For this reason and for use with future tactical high-energy systems, it is imperative to have a method to relate atmospheric weather parameters (like temperature, pressure, and wind profiles) to atmospheric turbulence.

The Air Force used Dr. Dewan's model, in conjunction with meteorological balloon observations in the Persian Gulf and Korean Peninsula, to reveal a peak of optical turbulence associated with subtropical jets. Dr. Dewan's model and its future improved versions show promise crucial to future Air Force optical turbulence prediction systems for many years to come as the Air Force develops new high-energy laser systems.

Dr. Dewan has published 111 scientific papers, given more than 145 presentations, and recently received the Guenter Loeser Memorial Award for lifetime achievement.

Office of Scientific Research
Awards and Recognition

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-OSR-08)